**AMENDMENTS TO THE DRAWINGS**

Submitted herewith are formal drawings of Figures 1-10. Please substitute formal drawings of Figures 1-10 for the informal drawings originally filed.

## REMARKS/ARGUMENTS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 14, 16 and 17 remain pending.

Claim 15 was rejected under 35 USC 112, second paragraph, as being indefinite. To advance prosecution, claim 15 has been canceled hereinabove.

Claims 14-16 were rejected under 35 USC 103(a) as unpatentable over EP '740 in view of Oshima et al. or WO '416. Applicant respectfully traverses this rejection.

As defined in claim 14, the present invention includes a second ammeter connected in series between the power source and the first pumping electrode of the pump cell to detect a limit current value representing the oxygen concentration of the sample gas present in the sample gas chamber. Furthermore, in accordance with the invention as defined in claim 14, the first pumping electrode is located farther from the heater member than the second pumping electrode.

In general, the voltage applied to the pump cell is on the order of 1 V or less considering the durability of the zirconia solid electrolyte. As such, the current flowing in or across the pump cell is on the order of several mA.

In contrast, the voltage applied to the heater is approximately 12V (equivalent to several amperes in terms of the current value) because the heating element must generate a sufficient amount of heat to increase the temperature of the sensor element body to a predetermined activation level (usually 700 °C).

Thus, the voltage applied to the heater is substantially different in magnitude from the voltage applied to the pump cell. Consequently, a significant amount of leak

current flows from the high voltage side (i.e., heater) to the low-voltage side (i.e., pump cell).

Interposing a second ammeter between the power source and the first pumping electrode of the pump cell according to the invention of claim 14, is advantageous in accurately measuring the air/fuel ratio. If the second ammeter erroneously detects leak current from the heater, however, accurate measurement of the air-fuel ratio will not be feasible.

To solve this problem, the composite gas sensor of the invention is configured to prevent the second ammeter from measuring the heater leak current. More specifically, according to the invention as recited in claim 14, the second ammeter is connected to the first pumping electrode of the pump cell and the first pumping electrode, to which the second ammeter is connected, is located farther from the heater than the second pumping electrode of the pump cell.

Referring to the illustrated embodiment, the second ammeter (221) is serially connected between the power source (229) and the first pumping electrode (218) of the pump cell (21). As illustrated, the first pumping electrode (218) is located farther from heater (19) than the second pumping electrode (219). With this arrangement, the heater leak current is primarily absorbed by the second pumping electrode of the pump cell and thus does not reach the first pumping cell of the pump cell. Accordingly, it is possible to effectively prevent the second ammeter from measuring the heat leak current with the claimed configuration. Consequently, the claimed invention realizes a highly accurate measurement of the air-fuel ratio.

None of the references cited by the Examiner, whether taken alone or in combination, disclose the composite gas sensor recited in claim 14 having the specific components and configuration claimed so that the record prior art does not anticipate nor render obvious the invention, nor is it capable of achieving the advantageous results made possible by the invention.

As noted by the Examiner, EP '740 does not disclose a second ammeter serially connected between a power source and the first pumping electrode as claimed by applicant. The Examiner cites Oshima as allegedly overcoming the deficiencies of EP '740. In this connection, the Examiner refers to Figure 10, column 3, lines 2-13 and column 17, lines 58-66. Figure 10 is a graph and does not illustrate any ammeter 16 as alleged by the Examiner. Figure 7, which is referenced in column 7, lines 58-66, illustrates an ammeter 16 serially connected to a pumping electrode 6-b that is disposed closer to the heater, which is disposed below layer 5-6. Thus, Oshima does not teach or suggest the ammeter placement claimed nor otherwise meet the limitations of applicant's claim. WO '146 also fails to teach or suggest the configuration specifically recited in claim 14, comprising first and second ammeters disposed as claimed, in the combination claimed. In fact, WO '146 teaches away from the combination claimed because WO '146 teaches providing all ammeters series connected to electrodes disposed on the same substrate and provides no teaching relevant to their placement relative to a heater. Thus, the skilled artisan would not arrive at the claimed invention from a combination of EP '740 and WO '146 without the benefit of applicant's disclosure.

In view of the foregoing, reconsideration and withdrawal of the rejection of claims 14 and 16 is solicited.

Claim 17 was rejected under 35 USC 103(a) as unpatentable over EP '740 and either Oshima or WO '146 and further in view of Joshi. Claim 17 is submitted to be patentable over the primary combination for the reasons advanced above. The Examiner's further reliance on Joshi does not overcome the deficiencies of the primary combination noted above. therefore, claim 17 is allowable as well.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: 
Michelle N. Lester
Reg. No. 32,331

MNL:slj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100